

REMARKS

In response to the Office Action mailed October 3, 2007, Applicant respectfully requests the Examiner to reconsider the above-captioned application in view of the foregoing amendments and the following comments.

Double Patenting

Applicant notes the non-statutory obviousness-type double patenting rejection of Claims 37-59 and 52-67 over Claims 11-21 of U.S. Patent No. 6,733,291. To advance prosecution, Applicant is submitting with this Amendment a Terminal Disclaimer to overcome this rejection.

Claim Rejections - 35 U.S.C. § 112

Claims 48, 49, 61 and 63-67 stand rejected under 35 U.S.C. § 112, first paragraph, the Examiner maintaining that these claims fail to comply with the written description requirement.

Applicant respectfully disagrees this rejection. With reference to the paragraph numbering in the published application (i.e., U.S. Patent Publication 2004-0175674), in paragraph 53, the bottom surface 50 of the abutment is described as having a diameter "approximately equal to the bottom surface 24 of the implant 20." The protrusions 64 and cylindrical portion 64 are "configured to fit within" the corresponding channels 36 and chamber 34 of the implant 10. *Id.* In addition, original Claims 12 and 15 of the present application states that the interlock area, channels and post of the second prosthodontic component are configured to mate with the corresponding channels and cylindrical portion of the implant.

With reference to paragraph 046, the ratio between the radius R4 of the implant and the radius of the channels R2 is described as being between 4:1 to 5:1 and in one embodiment 4.5:1. In paragraph 045, the ratio of the cylindrical portion and the channels is described as being about 3:1.

As stated in MPEP 2163.02, the standard for determining compliance with the written description requirement is "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." Moreover, the "subject matter of the claim need not be described literally (i.e., using the same terms or in *haec verba*) in order for the disclosure to satisfy the description requirement. *Id.*

In this case, Applicant respectfully submits that one of ordinary skill in the art would recognize that the ratios with respect to the channels, cylindrical portion and top surface of the

Appl. No. : 10/800,818
Filed : March 15, 2004

implant apply to the mating components (protrusion, post and bottom surface) of the abutment or second component.

To provide antecedent basis for the relevant claim limitations, Applicant has amended the Specification as set forth above. For the reasons outlined above, Applicant submits that this paragraph does not add new matter to the application.

With respect to Claims 37, 41 and 57, Applicant has amended these claims to correct the informalities.

With respect to Claims 52-55, Claim 52 has been canceled without prejudice and replaced with Claim 68 described below. Claims 53-55, as amended, depend upon new Claim 68.

Applicant has also amended Claim 56 to correct a typographical error.

Claim Rejections

Claims 37, 40-42, 47, 52, 55 and 56 stand rejected under 102(e) as anticipated by Duerr (5,823,776). Claims 37, 40-43, 52 and 56 stand rejected under 102(b) as anticipated by Klardie (5,782,918). Claims 38, 39, 43-46, 48, 49, 53, 54 and 57-67 stand rejected as obvious over Duerr. Claims 38, 39, 44-40, 53-55 and 57-67 stand rejected as obvious over Klardie et al.

Applicant notes that the neither Duerr nor Klardie provide dimensions for the components identified by the Examiner as corresponding to the protrusions and cylindrical portion. As stated in MPEP 2125, when "the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value." For at least this reason, Applicant submits that the anticipation rejection of these claims are in error because the cited reference do not teach or disclose the claimed ratio of the first radius to the second radius as recited in the rejected claims. Moreover, even if the drawings of Duerr or Klardie were drawn to scale, they clearly do not lie within the claimed range.

As noted above, the Examiner also rejected several of the pending claims as being obvious over either Duerr or Klardie stating that "they do not show a specific ratio of the radii" But, that "it would have been obvious to one of ordinary skill in the art as to a specific ratio within an acceptable range and the specific ratio is not disclosed as critical to the claimed invention."

Applicant respectfully disagrees. Both references are similar in that they disclose relatively small features spaced about a cavity. Applicant recognized that such structures were

not desirable even though they provide some advantages (e.g., multiple rotational positions for the abutment). Accordingly, Applicant claimed specific ratios of the post and protrusions to reduce stress concentrations in the implant and/or the abutment. Moreover, as described in the paragraphs from the Application below, Applicant specifically described these ranges as being important features.

[0045] The cylindrical portion 35 has a first radius R1 and the semi-circular channels 36 have a second R2. The ratio α of the first radius R1 to the second radius R2 preferably is between 2:1 and 4:1. In the preferred embodiment the ratio α is about 3:1. This arrangement is preferred to minimize stress concentrations in the dental implant 10, as will be explained below. To reduce stress concentrations further, the interfaces 39 between the channels 36 and the cylindrical portion 35 are preferably rounded.

[0058] An advantage of the illustrated implant 10 and mating abutment 38 is that when subjected to rotational forces the stress concentrations in the implant 10 and the abutment 38 are minimized. Stress concentrations refer to areas of large stress caused by geometric discontinuities (i.e., stress risers) and/or the application of large loads over a small area or at a point (e.g., at a corner or apex). Areas of large stress concentrations are often the starting point of material damage, which can ultimately lead to material failure by fracture (i.e., cracking). Thus, by minimizing stress concentrations, the durability of the implant 10 and the abutment 38 can be increased. The reduction in stress concentration derives from the particular preferred shape of the interlock chamber 34, of the implant 10 and the mating interlock region 44 of the abutment 38.

[0059] FIGS. 4A-C are schematic representations of the shape 78 of the interlock chamber 34 and the interlock region 44. FIG. 4A compares the shape 78 to a triangle 79. As seen in FIG. 4A, the shape 78 of the interlock region is in the form of an elliptically modified triangle 79. That is, the apexes and sides of the triangle are substantially rounded. As shown in FIGS. 4B and 4C, the shape 78 provides a smooth transition from the apex 82 to the sides 80. Accordingly, some of the anti-rotational stress is distributed away from the apex 82 towards the relatively flatter side walls 80. These features help to reduce stress concentrations. Therefore, the interlock regions 34, 44 of the implant 10 and the blank abutment 38 (particularly the channels 36 and the protrusions 64 are less likely to chip and wear away as compared to prior art anti-rotational means. Moreover, the implant 10 is less likely to crack as compared to implants with hexagonal recesses, which tend to crack at the apexes of the hexagonal recess when subjected to large rotational loads (e.g., when a self-tapping implant is being threaded into the patient's jawbone).

Appl. No. : 10/800,818
Filed : March 15, 2004

Moreover, with respect to Klardie, this reference does not disclose a cylindrical portion with at least semi-circular protrusion arranged around the periphery but instead discloses a tapered structure with a plurality of splines and flutes formed in the cone surface. Col. 3, lines 50-65. This tapered structure is important to the snapping feature of the abutment described by Klardie. That is, the tapered structure is provided to gradually compress the snapping prongs of the abutment. There is no motivation in Klardie for modifying this feature and making it cylindrical. Indeed, doing so would change the function of Klardie.

With respect to Duerr, this reference suggests providing multiple grooves and noses (see Col. 5, lines 20-35) to provide the surgeon with a number of desired positions. Accordingly, this reference teaches away from the ratios claimed in the present application. That is, there is no motivation for moving towards the claimed ratios which would reduce the number of desired positions available to the surgeon.

Accordingly, Applicant respectfully submits that the rejection of Claims 37-49 and 53-67 be withdrawn.

Claims 52 and 56 have also been amended to recite that the protrusions are substantially semi-circular.

New Claim

New Claim 68 replaces claim 52 which was canceled without prejudice. This claim recites in part "a substantially cylindrical post extending below the bottom surface, the substantially cylindrical portion including a plurality of substantially semi-circular protrusions arranged around a periphery of the substantially cylindrical post, wherein the substantially cylindrical post has a first radius and the protrusions have a second radius, a ratio of the first radius to the second radius being between approximately 4:1 and approximately 2:1 and wherein the protrusions have a length measured from the bottom surface of the upper region that is equal to a first distance and the substantially cylindrical post has a length measured from the bottom surface of the upper region that is equal to a second distance, the first distance being less than the second distance." As noted above, the cited art does not teach, disclose or suggest an abutment with the above noted features.

Claims 53-57, as amended, depend upon new Claim 68.

Appl. No. : 10/800,818
Filed : March 15, 2004

New Claim 69 recites, in part, a "dental abutment comprising: a body portion with a bottom surface; and lower region comprising a post and an interlock region adjacent the bottom surface, the interlock region being formed as a single continuous curve having substantially no internal corners, the single continuous curve being formed from a substantially cylindrical portion and a plurality of semi-circular protrusions spaced around the periphery of the cylindrical portion at approximately 120 degrees from each other." Neither Duerr nor Klardie disclose an abutment with the above-noted features.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims [and specification]. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

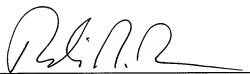
The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve such issue promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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AMEND

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